

"the packet"

The newsletter of V.A.D.C.G.

The Vancouver Amateur Digital Communications Group

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Vancouver Amateur Digital Communications Group

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IN THIS ISSUE

Yes, it's a long time from March to July. We had planned to put out a newsletter every two months, but instead it has been four. It will not be as long before the next one. We hope that the information content will make up for the delay.

Because of the Canadian postal strike, this issue is being mailed in the US. Canadian members will just have to wait until the strike is over.

Doug Lockhart has exciting news in his report on the first transmission of information packets via satellite.

Doug also presents several program fixes and asks for feedback from users. The newsletter should be two-way communication. Please let us know what you are doing, any mods you may have made, problems you have overcome (or still have), activity in your area, etc.

John Spraggs presents his "Echo Killer" program for the Apple and keeps us up to date with "That's Progress" and "Random Bits".

Hints on Getting the VADCG Board Up and Running is reprinted from the Hamilton and Area Packet newsletter.

 FIXES TO VADCG SOFTWARE

A number of different programs to run in the VADCG programmable packet radio controller have been distributed to various points in North America on 8-inch single density diskettes in the CP/M format. As these programs have been copied and supplied to other than the original recipients, I cannot deliver corrections and updates to the users of these programs directly. This is why they are included in 'The Packet.' I assume that any users of VADCG software will be getting the VADCG newsletter since we will be announcing any new changes and corrections to the software in the newsletter. In addition, we will advise of any new programs and their availability in the newsletter.

If you have any problems, suggestions, fixes or additions to the software or any new programs for the VADCG board I would appreciate receiving them. The VADCG will be distributing programs to run in the board. In spite of the fact that these programs have taken many man-hours to develop, there have been no charges for the software. It is expected that anyone using these programs will consider himself obligated to feed back information on errors and corrections as well as any new software development for the board. Any such feedback or requests for supply of software should be sent to the author, Doug Lockhart, VE7APU.

Application of these fixes will make the board work a lot better!

(Program fixes start on page 7)

THE VANCOUVER AMATEUR DIGITAL COMMUNICATIONS GROUP

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Vancouver, B.C., July 8, 1981

Another first for Amateur Radio Digital Communication was accomplished today when information packets were passed between Ottawa and Vancouver via satellite as the first step in an experiment to interconnect Amateur packet radio networks in these two cities. The satellite used was the Anik-B geostationary satellite operated by the Canadian Department of Communication which is providing communication channels for the experiment. The packets exchanged were in HDLC format using the ASCII code. The digital equipment used at both ends was the packet radio controller developed by the Vancouver Amateur Digital Communications Group. The purpose of the experiment is to develop efficient hardware and software techniques for interconnecting local communication networks over widespread geographical areas and additionally, to demonstrate satellite packet techniques. It is expected that the expertise developed will be of direct application to the amateur radio environment in the near future.

The DOC has installed a 20 watt TWT (Travelling Wave Tube) transmitter at one of their earth stations near Vancouver to provide an additional telephony channel to conduct the experiment. This transmitter operates in the 14/12 GHz. satellite band.

This project is jointly sponsored by the Canadian Radio Relay League (CRR) and the Canadian Amateur Radio Federation (CARF). However, the funding, equipment and technical work to interface the channel to the amateur radio networks is being provided by the Vancouver Amateur Digital Communications Group (VADCG) and by the Ottawa packet radio group.

For further information contact either Hugh Pett, VE3FLL, 36 Lismer Cr., Kanata, ON, K2K 1A2 or Doug Lockhart, VE7APU, 1263 Balfour Ave., Vancouver BC, V6H 1X6 (Tel. 604-738-5683) ☐

The 1200 baud modem card has been populated and tests are almost complete to prove out the pc layout and changes added since the previous prototype. One-to-one artwork and a run of these single-sided boards will be next on the schedule for this unit.

The Maple Ridge Hamfest saw us out there again this year to demonstrate our wares and give a short discussion. The interest expressed was encouraging, but the demo wasn't as flashy as we had hoped. A suspicious arc was noted while putting it together and we never did convince that terminal node board to talk to its Apple computer properly. The beacon program worked alright in that board so we did show packet radio in action.

One of the most interested persons we talked to was Gord Tremain of Vulcan Computer systems who was exhibiting next to us. When he offered hardware support, it wasn't too long before we had agreed on an Apple II with all the trimmings to be set up as an Apple Bulletin Board System. Besides the normal phone line access, a term node board should provide the message store function for our packet network.

More and more articles in ham and computer hobby magazines are mentioning the progress we are achieving in packet radio. Byte, S-100 and QST are some.

An order for 100 more term node boards has become necessary, mainly due to the high consumption rate in the San Francisco area. We have orders for more boards than are currently on hand. By the time the Canadian postal strike is settled, we may have the boards ready.

Dave Bowman has come up with a cheap video controller board which uses an Intel apnote design. The

board is available in the USA for about \$40. With a group purchase of parts it will be about \$150 Can. It is 80 x 24, with a matrix kbd encoder and serial I/O. Let us know if you are interested, as quickly as possible. With a crt monitor, TNC board, modem, 2M rig and one of these you'd be all set. Plus power supplies, of course. ☐

RANDOM BITS

John Spraggs

The Northwest DX Convention has invited Doug Lockhart and John Spraggs to give a demo and talk at their gathering in Portland, OR. August 8-9 are the dates. The Vancouver Computer Fair will also have us out there with a demo again, this time in October. Plans are to make up some really robust packages that Murphy won't be able to get at so easily, we hope!

Efforts are afoot to try to reserve a high altitude site for the Vancouver station node location. One of the local 1000 metre mountains is what we are hoping for. This will give us a good chance for up to 200 km coverage.

If you need help populating your term nod board, we have some of the harder to get ones available, like the 8273.

Richard, VE7CVS, is looking at a gateway into the local 45.45 baud network on 147.10 MHz. Baudot to ASCII conversion will be required. With the ANIK link in operation by then, this may surprise a few RTTYers with their new DX capabilities. ☐

HF PACKET RADIO NETWORK PROPOSED

AMRAD (The Amateur Radio Research and Development Corporation) has proposed the idea of setting up a North American amateur digital communications network. The formal proposal for funding has been submitted to the ARRL. The system which is called AMNET (AMateur NETwork), involves the setup of seven HF packet radio stations in different areas of the U.S. which would be interconnected to local packet radio networks operating on VHF. The advantage of this approach is the provision of a low speed backbone communication system for the whole of the country before a high speed VHF/UHF or satellite system becomes widespread. One of the 'nodes' is proposed to be in Seattle. If the network is approved and funded, the Vancouver local network could be linked into this node. The VADCG has had opportunity for input of ideas for this proposal. Doug Lockhart, VE7APU has been fairly regularly talking with Paul Rinaldo, W4RI who wrote up the proposal for AMNET and is the president of AMRAD. These talks take place on 20 meters most Saturdays at 9 a.m. Pacific time which is noon, Eastern time. VE7APU transmits on 14.178 and W4RI transmits on 14.204 MHz.

The proposal includes the use of the VADCG programmable communications interface cards and much of the design of the software will be from the VADCG. It should be noted that the control methods used on HF radio will be substantially different than those which are suitable for VHF and UHF. The characteristics of an HF channel are entirely different from those of a VHF channel. Although never tried before, it looks like it can be made to work. □

APPLE ECHO KILLER

John Spraggs VE7ADE

While setting up my Apple micro-computer for use as a remote host on the packet switching network, it became necessary to prevent it from echoing whatever it received. Since local echo (Half Duplex) is required when assembling a packet for transmission, a remote user would have no use for such an echo. He already knows the data will be accurate and the extra transmission is a waste of channel time as well.

This machine language program is inserted in the Apple's output hooks by the Applesoft Basic program. It tests the stack in order to bypass the current output routine. If the caller's address is that of the monitor's input echo segment, it returns immediately,

instead of jumping to \$C205, the O/P entry point (after initialization) to my serial card in slot 2. The extra time required to process the input did not have any effect at the 9600 baud setting we used.

```

100 REM DRIVES ECHO KILLER
110 REM AFTER INITTING SER CARD
120 D$=CHR$(4)
130 PRINT D$;"BLOAD ECHO
    KILLER1.OBJO
140 REM $305
150 PRINT "PR#2"
160 PRINT "HALF DUPLEX MODE"
170 POKE 54.05: POKE 55.03
180 IN# 2
190 CALL 1002

```



```

*****
0000:      2 ; ECHO KILLER
0000:      3 ;   FOR
0000:      4 ; CAL COMM SYS
0000:      5 ; SERIAL CARD
0000:      6 ;   SLOT 2
0000:      7 *****
0000:      8 ; TESTS WHO CALLED COUT
0000:      9 ; IF INPUT ROUTINE
0000:     10 ; FROM FD47 THEN
0000:     11 ; RETURN IMMEDIATELY
0000:     12 ; ASSUMES SLOT 2 FOR O/P
----- NEXT OBJECT FILE NAME IS ECHO KILLER1.OBJ0
0305:     13      ORG   $305
0305:48    14      PHA
0306:8A    15      TXA
0307:48    16      PHA
0308:BA    17      TSX:
0309:BD 03 01 18      LDA   $103,X      ;NO DOS
030C:C9 49    19      CMP   #$49      ;TEST LSB
030E:F0 09    20      BEQ   INC1      ;Y,TRY MSB
0310:E8      21      INX           ;N,POINT HIGHER
0311:E8      22      INX           ;FOR DOS JSR
0312:BD 03 01 23      LDA   $103,X      ;PENDING
0315:C9 49    24      CMP   #$49      ;TRY LSB
0317:D0 0C    25      BNE   PASS      ;N,DO O/P
0319:E8      26 INC1: INX           ;POINT AT
031A:BD 03 01 27      LDA   $103,X      ;MSB
031D:C9 FD    28      CMP   #$FD      ;ECHO?
031F:D0 04    29      BNE   PASS      ;N,DO O/P
0321:68      30      PLA           ;Y, SO
0322:AA      31      TAX           ;RESTORE
0323:68      32      PLA           ;AND DO
0324:60      33      RTS           ;NO O/P
0325:68      34 PASS: PLA           ;
0326:AA      35      TAX           ;RESTORE
0327:68      36      PLA           ;AND
0328:4C 05 C2 37      JMP   $C205      ;OUTPUT

```

USE OF VADCG CONTROLLER WIDESPREAD

The growing acceptance of the VADCG programmable communications card for use in developing packet radio networks throughout the U.S. and Canada has required the order of an additional 100 boards from our PC manufacturer. The boards are being actively used by groups in the San Francisco and Washington, D.C. areas as well as in Vancouver, B.C. and Hamilton, Ont. It is rumoured that a packet radio group in the Los Angeles area will also be using these boards. These boards have been sent to many locations in the U.S. and Canada and one has even been sent to Germany. We hope that these locations will be developing local networks around this board and that it will gain wide enough acceptance as to become a standard of sorts for packet radio development.

VADCG PROGRAM MEMO #1

DATE: December 24, 1980

AFFECTS: LIP programs (Link Interface Programs) distributed before the above date.

SYMPTOMS: Program failure or erratic operation when link buffer becomes full.

CAUSE: Incorrect testing for buffer overflow and incorrect action when buffer overflow occurs in the 8273 receive interrupt handler.

FIX: In the source file for the LIP program locate the following statements in the receive interrupt routine, "RXINT."

```

INCLB 4
JNC STARTRX ; GOOD, GO AND START RECEIVER
OVERFLOW:
LXI H,DISRX ; POINT TO DISABLE RECEIVER COMMAND

```

Change these statements to the following:

```

INCLB 4 ; HL <-- LBIP + 4
JZ OVERFLOW1 ; OOPS, NO ROOM LEFT
JC OVERFLOW1 ; OOPS, NO ROOM LEFT
JMP STARTRX ; GOOD, GO AND START RECEIVER
OVERFLOW:
PUSH D ; SAVE REST OF REGISTERS
PUSH B
OVERFLOW1:
LXI H,DISRX ; POINT TO DISABLE RECEIVER COMMAND

```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #2

DATE: June 7, 1981

AFFECTS: LIP and LIPTT programs (Link Interface Programs) distributed before the above date.

SYMPTOMS: A continuous retransmission of supervisory frames between nodes when the link buffer becomes full.

CAUSE: Omission of code which records acknowledgment of a supervisory frame.

FIX: in routine 'INFRAME:' find the following statement:

```

ORA B ; OR ON REQUIRED BITS

```

After this statement add the following 11 lines:


```

MOV B,A      ; SAVE STAT1 IN B
ANI POLLR    ; IS POLL BIT ON?
MOV A,B      ; GET STAT1 BACK
JNZ INF2     ; YES, DON'T CHANGE RNRS
ANI RNRS     ; TEST RNRS
MOV A,B      ; GET STAT1 AGAIN
JZ INF1      ; GO SET RNRS TO 0 IF RNRS IS 0
ORI RNRS     ; RNRS = RNRS = 1
JMP INF2     ; SKIP NEXT LINE
INF1: ANI 0FFH-RNRS ; RNRS = RNRS = 0
INF2:

```

In routine 'NOTSYNC:' replace the following 3 lines:

```

LDAX B      ; A <-- CONTROL FIELD IN USBUFFER
ORI FBIT    ; TURN ON FINAL BIT
STAX B      ; UPDATE CONTROL FIELD IN USBUFFER

```

with the following line:

```

CALL POLLCHK1 ; DO FINAL BIT PROCESSING

```

In routine 'POLLCHK:' locate the following line:

```

LDA STAT1   ; GET MAINLINE STATUS BYTE

```

and add the following line after it:

```

POLLCHK1:

```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #3

DATE: June 8, 1981

AFFECTS: LIP and LIPTT programs (Link Interface Programs) distributed before the above date.

SYMPTOMS: Inability to receive after link buffer becomes full.

CAUSE: 8273 receive interrupt routine did not clear interrupt condition when data received after link buffer had filled up.

FIX: In the source file for LIP or LIPTT find the label, 'OVERFLOW:' and insert the following line after it:

```

IN RXDATA ; READ DATA TO CLEAR INTERRUPT

```

PREREQUISITE: Program Memo #1

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #4

DATE: June 9, 1981

AFFECTS: BEACON programs distributed before the above date.

SYMPTOMS: Inability of LIPTT programs to receive the data from the BEACON program.

CAUSE: The 8273 was not set to NRZI mode and the control field in all packets sent out was set for non-sequenced information frames (NSI) instead of sequenced I-frames.

FIX: In the source file for the BEACON program find the following statement:

SERIALIO DB 1,0AH,1 ; NRZI MODE

and replace it with the following statement:

SERIALIO DB 1,0A0H,1 ; NRZI MODE

Between the labels 'DATA' and 'DATAEND' there are a series of DB statements which represent the packets which will be sent out by the program. The format of each DB statement is a one-byte data length, a one-byte control field and the data to be placed in the packet. In all cases the control field is either a 3 or 13H. Change the 3 to 0 and the 13H to 10H in each occurrence.

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #5

DATE: June 9, 1981

AFFECTS: The sample TIP and TIPTT programs for the 8250 serial interface.

SYMPTOMS: The last byte in some packets is not being transmitted to the terminal when using a slow terminal.

CAUSE: The program was not waiting for the last byte in a packet to be completely sent before starting transmission of the first byte in the next packet.

FIX: In the routine, 'DISPATCH:' find the following statement:

RNZ ; YES, RETURN

Add the following lines after the above statement:

IN LSR ; GET LINK STATUS REGISTER
ANI THRE ; IS THE TRANSMIT HOLDING REGISTER EMPTY?
RZ ; NO, DON'T DO ANYTHING UNTIL IT IS

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #6

DATE: June 16, 1981

AFFECTS: LIPTT programs (Link Interface Programs for terminal to terminal communication) distributed before the above date.

SYMPTOMS: Spurious packets and incorrect control fields in packets being transmitted when in 'MONITOR' mode.

CAUSE: Code to set up control fields in packets while in 'MONITOR' mode was missing. Also, the 'poll' bit was not being set on in the final packet.

FIX: Replace all statements in routine, 'SETLOOP:' with the following statements:

```

SHLD    LTBOE    ; SAVE CURRENT ENTRY IN LTBOE
MOV     C,M      ; SAVE LENGTH IN C
INCTB   1        ; POINT TO CONTROL FIELD
MVI     M,0      ; SET CONTROL FIELD TO 0
MOV     A,C      ; GET LENGTH IN A
ADI     1        ; ADD 1 TO GET PAST HEADER
RST     2        ; POINT TO NEXT ENTRY
JNZ     SETLOOP  ; GO DO ANOTHER IF NOT FINISHED
LHLD    LTBOE    ; FINISHED, GET PREVIOUS ENTRY BACK
INCTB   1        ; POINT TO CONTROL FIELD AGAIN
MVI     M,10H    ; PUT FINAL BIT ON
XCHG    ; GET CTBIE IN HL
SHLD    LTBOE    ; INDICATE END OF LAST FRAME TO TRANSMIT
SHLD    OTBE     ; UPDATE OLDEST FRAME POINTER
RET     ; RETURN TO CALLER

```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #7

DATE: June 19, 1981

AFFECTS: LIPTT and LIP programs distributed before the above date.

SYMPTOMS: None.

CAUSE: Although this change does not correct any errors directly, it is a prerequisite for other fixes. It facilitates the transmission of supervisory and unsequenced packets and reduces the instruction path in the 8273 transmitter interrupt handling routine.

FIX: Replace all statements in routine, 'TXEARLY:' with the following statements:


```

LDA    TCMDCON ; GET LAST CONTROL FIELD SENT
ANI    FBIT+RR ; TEST CONTROL FIELD BITS
JNZ    EXIT    ; EXIT IF POLL BIT OR NOT I-FRAME
INCTB  1       ; POINT TO START OF NEXT ENTRY
SHLD   CTBOE   ; UPDATE CURRENT ENTRY POINTER
XCHG
LHLD   LTBOE
RST    5       ; WAS THAT THE LAST ENTRY TO SEND?
JNZ    TXBUF   ; NO, GO AND SEND THIS ONE
LXI    H,USBUFFER
SHLD   CTBOE   ; UPDATE TO SEND USBUFFER

```

In routine, 'TXRESULT:' replace the following 3 statements:

```

LDA    STAT2   ; GET LINK STATUS BYTE
ANI    0FFH-TXBUSY ; INDICATE TRANSMITTER NOT BUSY
STA    STAT2   ; UPDATE LINK STATUS BYTE

```

with these 3 statements:

```

XRA    A       ; ZERO ACCUMULATOR
STA    STAT2   ; INDICATE BOTH TX AND RX ARE NOT BUSY
LDA    TCMDCON ; GET LAST CONTROL FIELD SENT

```

Starting in routine, 'TXF1:' find the following 5 lines:

```

ANI    FBIT    ; TEST FOR FINAL BIT IN C-FIELD
JZ     TXF2    ; NOT PRESENT, BYPASS STATUS UPDATE
MVI    A,TXBUSY+FBIT ; TXBUSY=1,RXBUSY=1,FBIT=1
STA    STAT2   ; UPDATE MAINLINE STATUS
TXF2:  LXI    H,TCMDBUF ; POINT HL AT TRANSMIT COMMAND BUFFER

```

and replace with the following line:

```

LXI    H,TCMDBUF ; POINT TO TRANSMIT COMMAND BUFFER

```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #8

DATE: June 20, 1981

AFFECTS: LIPTT programs (Link Interface Programs for Terminal to Terminal communication) which were distributed before the above date.

SYMPTOMS: Program failure or spurious packets at during connection or disconnection.

CAUSE: Incorrect and inconsistent handling of a pointer into the terminal buffer when processing the connect buffer. The pointer was positioned incorrectly outside the buffer.

FIX: In routine, 'SENCNCT1:' find and delete the following two lines:


```
LXI    H,CBUFEND
SHLD   LTBOE
```

In the equates section find the following equate and delete it:

```
CBUFEND EQU    CCA+40H ; END OF CONNECT BUFFER
```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #9

DATE: June 20, 1981

AFFECTS: LIPTT programs distributed before the above date.

SYMPTOMS: Transmission of signon information as part of first information packet after signon.

CAUSE: The current terminal buffer input entry was not reset in the signon procedure.

FIX: Note that this fix causes modification of TBIP and BUFCOUNT by the LIPTT program when restart 6 is done from the TIPTT program to request connection. This should not have any effect if these variables are used in the same manner as in the sample TIPTT program. In routine, 'ALT1:' find the following line:

```
INCTB    2          ; POINT TO FIRST BYTE OF CALL FROM
```

and replace it with the following 5 lines:

```
INCTB    1          ; POINT TO ONE BYTE BEFORE DATA
SHLD     TBIP       ; SET POINTER TO REWRITE BUFFER ENTRY
INCTB    1          ; POINT TO CALL SIGN TO CONNECT TO
MVI      A,0
STA      BUFCOUNT   ; INDICATE EMPTY ENTRY
```

Doug Lockhart, VE7APU

VADCG PROGRAM MEMO #10

DATE: July 9, 1981

AFFECTS: LIP and LIPTT programs distributed before the above date.

SYMPTOMS: Controller locked up with neither 8273 receive or transmit active and line buffer exactly full of entries. Very intermittent.

CAUSE: The 'NEXTIN' subroutine used to pass received frames to the TIP could not tell the difference between a buffer exactly full with buffer entries and a completely empty buffer.

PREREQUISITES: None.

FIX: In the source file for the LIP or LIPTT program find the following line in routine 'NEXTIN':

RZ ; RETURN, ZERO STATUS IF NOTHING TO PROCESS

and replace it with the following 5 lines:

```

JNZ     NEXTIN0 ; YES, GO TO PROCESS IT
LDA     STAT3   ; GET OVERFLOW STATUS IN A
RRC     ; GET OVERFLOW BIT IN CARRY TO TEST
RNC     ; BUFFER EMPTY, RETURN WITH ZERO STATUS
NEXTIN0:      ; EXACTLY FULL IF WE FALL THROUGH TO HERE

```

Doug Lockhart, VE7APU

Hints for getting the VADCG board up and running

Once built, examine for all mechanical defects (shorts, cold solder) then apply power WITHOUT chips on the board. Verify there is the correct voltage at all pins of the sockets (+5, +12, open, ground).

Turn power OFF!

Insert 8085 and XTAL and divider chip (CMOS - careful).

Power up and attempt to see clock transitions at $\frac{1}{2}$ clock out from 8085, and lower frequencies on the divider. If no clock or if frequency seems strange, put 20pF from each side of XTAL to ground. (Seems to help startup on-frequency).

Power off.

Insert remainder of chips, including PROMs with LIP and TIP.

Power on (SMOKE TEST).

Examine the Tx data line of the 8273 for flags (continuous transitions). The DTR line (-PB2) should go to -12 while reset held down (+4 if only TTL outputs, not RS-232) and should go to +12 (0 if TTL) soon after button released.

**THIS PAGE WAS RESERVED
FOR MEMBER'S FEEDBACK.**

**IT IS UP TO YOU TO FILL IT
NEXT TIME!**

